to remedy a defect that had resulted in a particular disease, such as cystic fibrosis. This intervention would only affect the specific individual treated. No new issue of principle seems to be raised here beyond those that apply to medical therapeutics generally.

(2) Germline use. Here the technique would be applied either to gametes (egg or sperm) or to an early embryo. In contrast to somatic use, this kind of manipulation would have effects that could propagate to future generations. Because of grave uncertainties about what these long term effects could prove to be, and because of their irreversible character, there is currently a generally respected moratorium on human germline manipulation. Once again, however, one must ask the question: what would the ethical situation be if these uncertainties as to safety were to be resolved satisfactorily? If we could eliminate the propagation of Huntington's by genetic engineering, should we not do so? That would be seen as remedying a defect by restoration to the norm.

What, however, about attempts at enhancement beyond the norm? Discussion of designer babies with desirable characteristics (athletes or intellectuals), or self improvement of the human race, is science fiction talk today, but what if it became a feasibility, as forms of gender selection already are? Surely there are moral limits that must be placed on parental choice if its exercise is not to be in danger of commodifying children. In the prospect of genetically engineering progeny, one faces that danger in an extreme form. The human genome, in a sense the carrier of life, is an entity of such value that its manipulation is a matter of extreme ethical sensitivity. If I am right in suggesting that the genome is a small component in the constitution of the soul, it must surely be treated with sacred respect. We need to consider carefully whether it would not be a step too far for human beings to take it upon themselves to interfere with it. Here is a case where the hackneyed phrase ''playing God'' may really be relevant as a moral warning.

I do not find it easy to decide where and how to draw the moral line on this issue. It certainly cannot be done by a simple endorsement of the ''natural'' and a questioning of the ''unnatural''. Much of routine medical practice is unnatural in a plain sense. Recall the reservations initially expressed about heart transplants, now readily accepted as a therapeutic resource, though as radically unnatural as any genetic transfer. In any case, human beings are themselves a part of created nature. It is not inappropriate to end this paper with a moral question mark. I conclude where I began, with an emphasis on the need for the widest and most measured public moral discussion of the perplexing issues raised by contemporary discoveries in genetics. It is a debate of great importance to which we all need to seek to contribute and I very much hope to see the faith traditions making further distinctive contributions to this process.

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Commentary on: The person, the soul and genetic engineering*

J H Brooke

The far reaching effects of the genetic revolution on our lives as a whole make it difficult to separate the secular and sacred issues involved

In accepting this opportunity to comment on Dr Polkinghorne's Templeton Prize lecture, I recognise that there is a significant division between those who would see religious beliefs as irrelevant in the ethical debates concerning new biotechnologies and those who, with Dr Polkinghorne, are willing to look to the major faith traditions for insight into the nature of human identity and selfhood. In secular discourse, the intrusion of religious language has long been resisted on many grounds: that sound ethical principles do not need transcendent ratification; that those who presume a privileged moral discernment derived from their religion frequently fail to appreciate the complexity of genetic and medical science; and that internecine disputes within faith communities and historically rooted incommensurabilities between them seriously compromise any prospect of consensus. This problem is tacitly acknowledged by Dr Polkinghorne himself when he notes that his willingness to accept the 14 day threshold before which certain forms of experimentation on embryos are deemed permissible would not be congenial to Roman Catholic officialdom, for whom the destruction of one life cannot be condoned even if it were to make possible the creation of another.

Dialogue traversing a secular/sacred divide can be thwarted for other reasons. Those sympathetic to religious voices may concede that claims for privileged discernment are unhelpful but still insist that secular ethicists too readily fail to appreciate that religious beliefs can be constructive in strengthening motivation and in deepening commitment on ethical issues. Theologians who have served on ethics committees have sometimes expressed a sense of frustration accompanying their attempts to explain that they are starting from a different point, and working from different presuppositions, than those who settle for exclusively utilitarian and consequentialist principles.[1] The

*Lecture by Revd Dr John C Polkinghorne, winner of the 2002 Templeton Religion Prize given on given on Wednesday, 12 February 2003 at St Paul's Cathedral, London, UK

problem is not simply that different values may be held by religious believers serving on such committees: incompatible worldviews may also collide. It is difficult to see how the pleas for procreative autonomy that have sometimes been invoked in support of reproductive cloning[2] could be wedded to conservative Christian ideals in which a child is seen primarily as a gift of God and not a commodity to be designed to order.

Sir John Polkinghorne's reflections on the promise and the problems of genetic engineering are particularly welcome, not only because of the respect he invariably accords serious scientific research but also because they reveal the thinking of an influential theologian with years of experience on the British Medical Association Medical Ethics Committee and latterly on the Human Genetics Commission. In previous writings he has made no secret of his conviction that ''theology's concern with creation and with individual human identity and value means that it should be in a position to make a significant contribution to the debate''.[3] Noting that in the Abrahamic faiths special status is bestowed on each human creature by virtue of their being a ''personal object of divine love and compassion'', he has affirmed the ethical corollary that ''no human being is available for instrumental use of any kind''.[4] This would appear to proscribe more than the Kantian principle that an individual should never be used *exclusively* as a means. In the Templeton Prize lecture the note of caution is sounded several times: ''not everything that can be done, should be done''. And towards the end he is willing to invest the hackneyed phrase ''playing God'' with meaning as an apposite warning in some cases. Given the context in which he spoke, it would be reasonable to assume that many in his audience would have sympathised with that cautionary tone. I shall return to it later because objections based on the usurping of a Creator's role can be both diverse and problematic.

In Dr Polkinghorne's address there is the quest for a judicious balance between the implementation of new technologies and the advocacy of restraint. In this respect he stands in a long tradition of Christian commentators whose stance towards new technologies has not been oppositional. For centuries there have been resources within theology itself to sanction programmes for the enhancement of nature and of human life.[5] The iconoclastic medical reformer of the Renaissance, Paracelsus, saw in the application of chemical knowledge a *redemption* of nature; Francis Bacon spoke of a *restoration* to a pristine condition of nature before the Fall; concepts of improvement were easily subsumed under doctrines of Providence, as when Joseph Priestley, in the late eighteenth century, set new science in opposition to superstition but not to a rational religion.[6] Legacies from past theologies still appear in contemporary debate and in ways that create the space for innovative therapeutic techniques. In one of his early essays on theology and the genetic revolution, Ronald Cole-Turner referred to genetic engineering as ''redemptive technology'', adding that ''we may regard it as redemptive intervention if a couple is screened, found at serious risk, and advised not to conceive a child''.[7]

Concepts of human dignity that frequently feature in theological discourse are sometimes envisaged as intrinsically obstructive to programmes for genetically modified humans. It was observed by Roger Brownsword, Specialist Adviser to the House of Lords Select Committee on Stem Cell Research, that the Committee did not find appeals to human dignity particularly helpful.[8] Yet there are sophisticated theological discussions in which dignity is understood relationally rather than being predicated of an embryo at its origin. A Lutheran theologian, Ted Peters, has written that ''dignity is a relational concept that begins first with the external conferral of dignity before it is claimed by a person as something intrinsic''.[9] Drawing on a Christian eschatology, he insists that ''rather than something imparted with our genetic code … dignity is the future end product of God's saving activity that we anticipate socially when we confer dignity on those who do not yet claim it''.[10] In theologies of this kind, the dignity honoured can be that of future beneficiaries of medical research.

Openness to innovative techniques has been a special feature of theologies in which *Homo sapiens*, ostensibly made in the image of God, is seen as a co-creator with (or more modestly collaborator with) a beneficent deity. Such constructs are not new. It was a facet of Isaac Newton's theology that ''that power which can bring forth creatures not only directly but through the mediation of other creatures is exceedingly, not to say infinitely greater''.[11]

In their different ways each of these theologies would problematise distinctions between the natural and the artificial, removing objections, as Dr Polkinghorne also does in his concluding paragraph, to interventionist techniques based on their alleged deviation from the ''natural''. The justification of medical intervention in other contexts has long been paradigmatic for the legitimation of what in ultraconservative religious circles might once have been understood as interfering with providence. This is not to deny that revulsion against certain transgenic practices is often expressed with religious fervour. It is, however, worth noting that public anxiety may derive as much from an outdated essentialist concept of species as from explicitly religious scruples. There is an irony here because those who object most strenuously to any form of genetic modification, whether of food or of those who eat it, commonly and unwittingly presuppose the very genetic reductionism from which a more holistic, religious understanding of the human person might be thought to offer protection.

In the conceptualisation and transmission of that understanding, the word ''soul'' has been of particular significance. One of the most creative and stimulating features of Polkinghorne's text is his attempt to reformulate the concept of soul in a way that is coherent with the monistic presuppositions of the neurosciences. The indestructible soul of Cartesian dualism has no place in his philosophy, reminding us that Protestant theologies in particular have tended to construe the prospect of an afterlife in terms of the resurrection of the body rather than the automatic survival of an immaterial substance. Although there are eminent philosophers of religion still prepared to defend a dualistic interactionism in which mental states are states of a distinct mental substance,[12] Polkinghorne's redescription of the soul in terms of information bearing patterns sits more comfortably with the dual-aspect monism currently finding favour with religious thinkers.[13]

For a historian of science the assertion that the ''pattern is my soul''—that which stands for ''the real me''—is engaging because something similar was tried by David Hartley and his admiring successor Joseph Priestley in the eighteenth century. This was of course in the absence of modern information theory but the basic concept was similar. In the development of a person patterns of vibration were established in the material substrate of the mind. Their being somehow ''fixed'' and persistent was evidenced by the facility with which ideas were associated and recurred in association. A ''real me'' was constituted by a distinctive pattern or series of patterns that could in principle be reconstituted in a resurrected body. This was pretty daring stuff, especially in Priestley's Unitarian theology. And its critics posed the question whether the

recurrence merely of a pattern was sufficient guarantee of the continuity of personal identity. A fellow dissenter, Richard Price, took exception to Priestley's account of the hereafter[14]:

> It is … implied, that the men who are to be raised from death, will be the same with the men who have existed in this world, only as a river is called the same, because the water, though different, has followed other water in the same channel … Did I believe this to be all the identity of man hereafter, I could not consider myself as having any concern in a future state.

There is clearly a question whether a comparable objection might not be levelled against the equation of individual identity with an information bearing pattern. I shall not, however, pursue that question here because, at this juncture in his argument, Polkinghorne is careful to say that he is speaking from within a Christian tradition in which one's *hope* is grounded in higher level axioms of divine fidelity and remembrance.

A question that might be pursued concerns those points in the lecture where cautionary principles were enunciated but where the limitations of a lecture format precluded further articulation. There are references to an ''unacceptable degree of commodification'', to ''moral limits'' that must be considered in the context of genetic enhancement beyond a norm, and to the applicability of the ''playing God'' objection as a warning against unstudied interference with the human genome.

Concerns about an *unacceptable* degree of commodification are voiced in the context of preimplantation diagnosis and in the selection of what may be deemed ''the best'' embryo for selection purposes. It is perhaps pertinent to ask at what step the *degree* of commodification becomes unacceptable. Does the threshold lie with any attempt at genetic enhancement, where questions can be asked about the wisdom of an artificial selection in which offspring may have to live with the knowledge that their particular strengths, rather than others, had been deliberately selected for them? Would the much publicised case of ''saviour siblings'' constitute an example of *acceptable* commodification, given that in this case ''the best'' can be specified as the best match for the role of donor. The issues here are complex because if the additional child were to be perceived by the parents as only a means to an end, then references to inappropriateness might be salient. However, one could envisage that the saving child would be loved all the more for having made a priceless contribution to the life of the family. It is even conceivable that parents with religious convictions would see in the technological intervention a kind of ''miracle'' that would not preclude seeing the later child as a divine gift. From the child's point of view, it is surely undeniable that there could be deeply conflicting feelings. It might be difficult to prevent the feeling that that they would not have come into being had they not been wanted for the saviour role—especially if they were to suspect that their parents would not otherwise have had another child. Another concern might be the guilt feelings that could come from the knowledge that in the selection process, other embryos had been discarded. There could be the loss of that uninhibited gratitude for life, springing from the sheer improbability of one's existence, on which both religious and secular writers have movingly written.[15] On the other hand, the child might grow up to be grateful for the fact that his or her life had been given an additional meaning by virtue of its saving role—and even a possible religious meaning in conforming to a model of redemption through sacrifice. One thing is certain. It is impossible to generalise about consequences. What in one family might be a binding process, in another could be explosive. In the real world of sibling rivalry and jealousy, it is discomfiting to contemplate a scene in which one child could say to another, ''But for the grace of *me* you would be dead''. Speculations about psychological damage cannot be excluded from the debate and it should not be surprising that religious commentators take them seriously. Indeed, Polkinghorne has elsewhere declared the production of ''saviour siblings'' unacceptable: ''it would be very psychologically damaging for a child even to suspect that he or she owed their existence primarily to the duty to help a sibling, rather than for the sake of the value and worth of their own being''.[16]

When in the Templeton lecture he speaks of ''moral limits'' in the context of genetic enhancement beyond a norm, it is pertinent again to ask where the limits may lie. There are many issues here. One would be definitional problems concerning the ''norm''. It has been observed that much of the rhetoric in favour of genetic enhancements is couched in such therapeutic terms that it celebrates the supranormal without first considering what it means to lead a ''normal'' fulfilled human life. The faith traditions do have something to say about this, usually stressing the virtues of a communal rather than an isolated life. An arresting concern, expressed in a discussion of cloning by the theologian Stanley Hauerwas, underlines the existential questions: ''In the name of eradicating suffering, we use technological power to avoid being with one another in illness and death. Cloning thus becomes simply another means to escape the knowledge that, when all is said and done, we will each have to die alone''.[17] A second issue, which I shall not address here, concerns the relation between future programmes of genetic enhancement and earlier eugenic policies. Given the historical evidence, it should not be surprising that anxieties abound. The question is not simply ''How do we choose the traits for enhancement?'' but ''How do we choose the choosers?''. A third issue, which Polkinghorne's account brings into focus, concerns modifications of the human genome that he appears to think might jeopardise the ''soul'', in his special understanding of the word: ''If I am right in suggesting that the genome is a small component in the constitution of the soul, it must surely be treated with sacred respect''. Much may depend here on whether the soul is identified with an individual information bearing pattern, as Polkinghorne wishes to suggest, or whether one should speak of a soul as emerging from and having been made possible by the patterning to which he refers. As long as there could still be a ''real me'' in a genetically enhanced human, the problem might not be so acute. The deeper question must be whether such essentialist accounts of the human person can survive the challenge from those who affirm a heterogeneous and discontinuous self. Even here, however, there can be surprises. When Daniel Dennett published his *Consciousness Explained*, he presented his theory as one that was more propitious than its competitors for those who hankered after immortality: ''If what you are is that organization of information that has structured your body's control system … then you could in principle survive the death of your body as intact as a program can survive the destruction of the computer in which it was created and first run''.[18]

It is with reference to interference with the genome that Polkinghorne implies that the ''playing God'' objection may not be vacuous. In one respect the phrase will always be inappropriate because the most the biotechnologist *can* do is to manipulate existing materials to achieve something new: to play the Platonist demiurge is the most that could be aspired to even assuming such aspiration exists. There is no creation *ex nihilo*. The importance of clarifying what might be meant by the ''playing God''

objection has been urged in a recent analysis by Tony Coady.[19] To use such language may connote nothing more than the hubris involved in the anthropocentric thinking that makes human beings believe they are entirely the beneficiaries of creation. It may mean nothing more than that specified human purposes may result in bad consequences. If a theology of humans as co-Creators lies behind its use, the protest may be against claiming equality with a Creator. A more common meaning would be the usurping of roles reserved for a deity, though one might ask whether there is any evidence that genetic enhancement has been on the deity's agenda. Coady's analysis is helpful because it includes the observation that the non-religious can still make sense of the objection, where it denotes an adventure beyond what is *known* to be safe, a need for humility rather an attitude of overconfidence, and a willingness to admit that the prospect of bringing changes to human nature can be a legitimate source of apprehension. Nor does it escape his notice that those most likely to invoke the ''playing God'' critique are those who may be accused of doing the same if they presume to have inside knowledge of the mind of God.

My conclusion is a plea for toleration and a better understanding of public anxieties, whether or not they are couched in religious language. In an important essay Bryan Wynne has exposed the manner in which representations of ''the public'' are constructed and manipulated by bodies impatient, in that famous Baconian phrase, to ''effect all things possible''. Wynne's essay is a contribution to a book that had its origin in empirical studies which showed that public reactions to genetic engineering are often voiced in ways that reflect a legacy from theology, however secularised it may have become.[20] Having examined the reports of leading expert bodies on the ethical issues that are taken to underlie public concerns about genetically modified organisms (GMOs), Wynne identifies four framing assumptions that have been ''utterly unexamined and thus uncritically reproduced''.[21] The first is that it is only public concerns, and not institutional presumptions in favour of biotechnology, that are unthinkingly held and therefore in need of critical scrutiny. The second is that the public is only concerned about specific consequences of biotechnology and not also about the ''wider consequences of the endemic institutional denial of uncertainty''. The third is that ''cognitive content and emotional affect are not only categorically separable but also in some sense mutually inimical''. This enables legitimate public concerns to be dismissed as emotive reactions. The reality, according to Wynne, is that in many public responses there is an awareness that the issues are not just scientific but are about the quality of social relations—about ''accountability, control, direction, the representation of science as a creator of innovations, and a culture of public policy: in short about the undemocratic control of public meanings''. A fourth assumption underlying expert reports on crop biotechnology is that non-utilitarian ethical objections can be understood (and marginalised) as individual private preferences. Conveniently, questions about the tendency of dominant institutions to exaggerate the adequacy of existing knowledge and questions about societal responsibility for the unpredictable consequences of implementation are often obliterated. If Wynne's diagnosis is correct, there is a need for mediating minds in the public arena, and all the more so because, as a recent feature in *Nature* has reminded us, decisions taken at the highest level on such matters as transgenic agriculture are ultimately dependent on political contingencies as much as on scientific or philosophical rationalities.[22]

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